

THE TAXONOMY OF SOME INDO-PACIFIC MOLLUSCA WITH DESCRIPTION OF A NEW SPECIES

PART 2

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Abstract. A new name is proposed for the homonymous *Cerithium pulchrum* Sowerby, and a *Cantharus (Pollia)* species from the Fiji Islands is described as new to science. The identity of *Murex dentifer* Watson, *Engina contracta* (Reeve), *E. acuminata* (Reeve), *E. gannita* Hedley, *Phos pallidus* (Powys), *P. notatus* Sowerby, *Conus excelsus* Sowerby, *C. pulcherrimus* Brazier, *C. tannaensis* (Cotton), *C. moluccensis* Küster, *C. pulcher* A. Adams and *C. proximus* Sowerby, are elucidated on the basis of their type-specimens. *Cancilla (Ziba) bantamensis* (Oostingh), a Pliocene fossil mitrid from Indonesia, is recorded living in the Nicobar Islands.

Family CERITHIIDAE

Genus *Rhinoclavis* Swainson, 1840

Rhinoclavis Swainson, 1840, Treat. Malac., p. 315. Type species by SD (Herrmannsen, 1848)
R. vertagus = *Murex vertagus* Linnaeus, 1767.

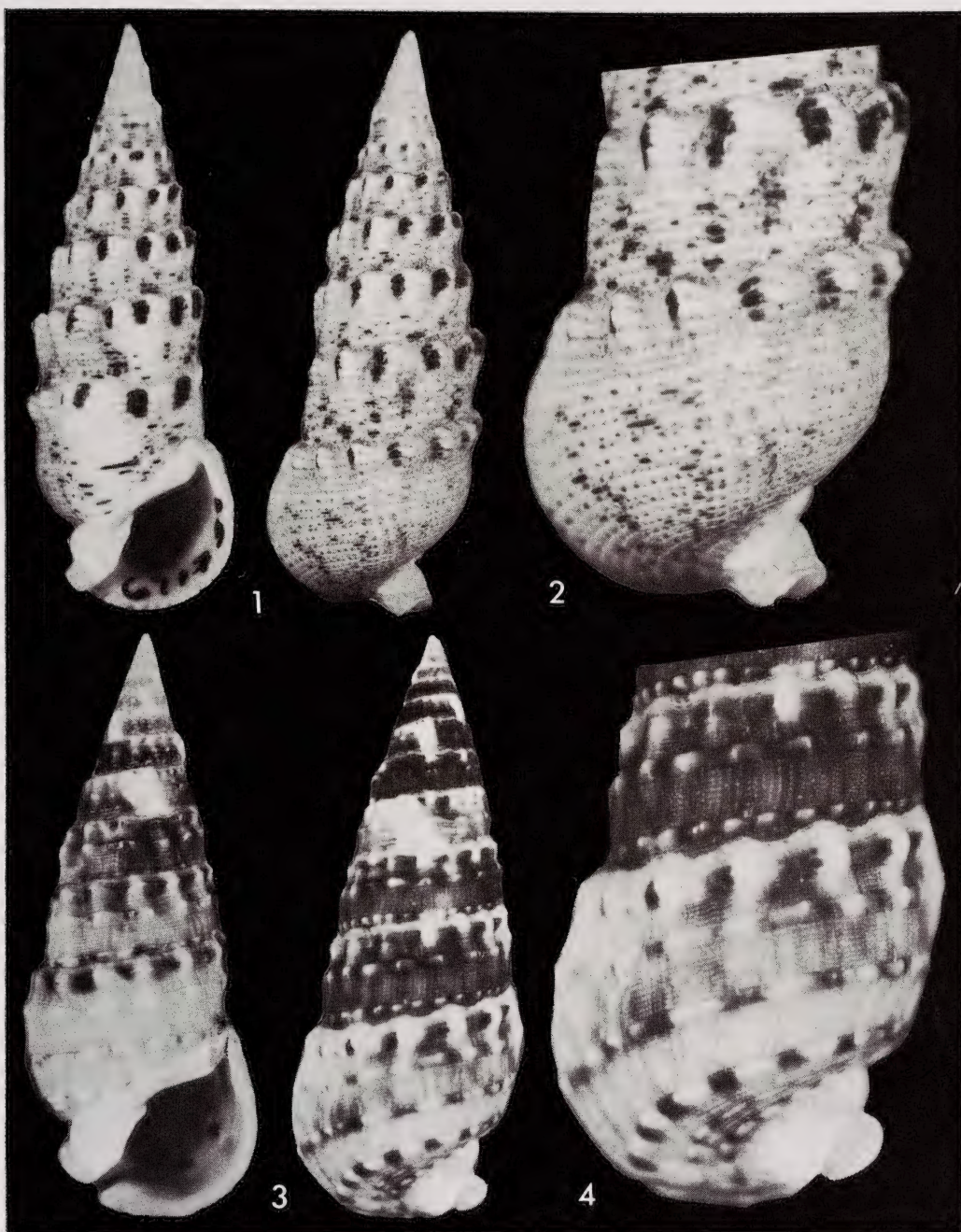
Rhinoclavis brettehami nom. nov.

(Figs. 1, 2)

1855. *Cerithium pulchrum* "A. Adams", Sowerby, Thes. Conchyl., 2 (2): 852, pl. 177, fig. 25 (North Australia); 1961 Rippingale & McMichael, Queensl. Gt. Barrier reef shells, p. 49, pl. 4, fig. 7 (non *C. pulchrum* C. B. Adams, 1852).
1865. *Vertagus pulcher* "A. Adams", Sowerby in Reeve, Conch. Icon., 15: pl. 4, fig. 20.
1887. *Cerithium pulcher* "A. Adams", Tryon, Man. Conch., 3: 146, pl. 27, fig. 42.
1907. *Clava pulchra* "A. Adams", Hedley, Proc. Linn. Soc. N.S.W., 32 (3): 481.
1952. *Rhinoclavis pulcher* Sowerby, Cotton, Roy. Soc. Sth. Aust. Malac. Sect., Cerithiidae, No. 2: 1, fig. 3; 1959 Allan, Australian shells, p. 89, pl. 17, fig. 18; 1963 Shikama, Sel. shells world col., 1: pl. 20, fig. 5; 1972 Cernohorsky, Mar. shells Pacific, 2: 68, pl. 15, fig. 5.

Cerithium pulchrum Sowerby, 1855, is a primary homonym of *C. pulchrum* C. B. Adams, 1852, which is a *Cerithidea* from the Eastern Pacific. The specific name is usually credited to A. Adams by early authors but the name has never been published under Adams' authorship. Bayle (1880) proposed numerous replacement names for Sowerby's *Cerithium* species, but omitted the homonymous *C. pulchrum* Sowerby, for which not even a varietal name is available.

Rhinoclavis brettehami is endemic to Australia, ranging from West Australia to Queensland. It is superficially similar to *R. bituberculatus* (Sowerby in Reeve, 1865) [= *Cerithium semigranosum* Lamarck, 1816, non Lamarck, 1804, = *C. cordi-*



Figs. 1-4. 1, 2. *Rhinoclavis bretteinghami* nom. nov. East of Cape Poivre, Barrow I., West Australia (USNM); length 41.4 mm, width 14.0 mm. 3, 4. *R. bituberculatus* (Sowerby in Reeve). Between Cape Dupuy and Cape Malouet, Barrow I., W. Australia (USNM); length 31.0 mm, width 12.3 mm.

gerum Bayle, 1880], but is coronate at the sutures and sculptured with numerous, close-set cords which are pitted in the interspaces (Figs. 1, 2). *R. bituberculatus* has two rows of larger nodules posteriorly to the sutures, and the body whorl has 3-4 nodulose spiral cords and very fine intermediate spiral threads (Figs. 3, 4). Both species are sympatric at Barrow I., West Australia and no apparent interbreeding takes place. *R. brettehami*'s range extends from West Australia to the Northern Territory and to Queensland, but *R. bituberculatus* appears to be endemic to Western Australia. The record of "Madagascar" in the National Museum of Natural History, Washington, requires confirmation.

Material examined. *R. brettehami*: St. Bus I., Mackay, Qld. (USNM); Brampton I., off Mackay, Qld. (USNM); Tryon I., Capricorn group, Qld. (USNM); Hayman I., Whitsunday group, Qld. (USNM); Nth. Keppel I., Qld. (AIM); North Brook I., Qld. (AIM); Bowen, Qld. (AIM); Dingo Bay, Qld. (AIM); Yirrkala, N.W. of Cape Arnhem, Nth. Territory (USNM); S. end of Harcourt Bay, Barrow I., W.A. (USNM); E. of Cape Poivre, Barrow I., W.A. (USNM); Between Cape Dupuy and Cape Malouet, W.A. (USNM). *R. bituberculatus*: Broome, W.A. (AIM); N.E. of Gantheaume Pt., Broome, W.A. (AIM); E. of Cape Poivre, Barrow I., W.A. (USNM); Between Cape Dupuy and Cape Malouet, W.A. (USNM); Irwin River, W.A. (USNM); Dunn Bay, W.A. (USNM); Cowaramup Bay, S.W.A. (USNM); Madagascar, Indian Ocean (USNM — record requires confirmation).

Family MURICIDAE

Genus *Murex* Linnaeus, 1758

Subgenus *Haustellum* Schumacher, 1817

Haustellum Schumacher, 1817, Essai nouv. syst., p. 213. Type species by absolute tautonymy *Murex haustellum* Linnaeus, 1758.

Murex (*Haustellum*) *dentifer* Watson, 1883

(Fig. 5)

1883. *Murex* (*Pteronotus*) sp. (*M. dentifer* n. sp.?) Watson, J. Linn. Soc. London, 16 (96): 601 (4°34'S and 129°57'E, 200-300 fathoms = near Banda I., Moluccas, Indonesia).
1886. *Murex* (*Haustellum*) sp. Watson, Rept. Sci. Res. Voy. H.M.S. Challenger, 15: 153.

The description of *M. dentifer* has been based on a broken, worn and senile specimen which has the slender canal completely missing, and because of this, has never been illustrated. The holotype of *M. dentifer* in the British Museum (Nat. Hist.), No. 1887.2.9.524, measures 41.0 mm in length (minus the canal) and 31.7 mm in width; it has 3 very strong varices per whorl, 3-4 axial ribs between varices, the columella has 5 plications on the parietal wall and another 5 smaller denticles near the start of the siphonal canal, the outer lip is denticulate and the specimen has faded to greyish-white. The anal notch is only weakly indicated and not as prominently "key-hole"-shaped as in *Haustellum haustellum* (Linnaeus). *Murex dentifer* from the Moluccas is most similar to *Murex tweedianus* Macpherson, 1962, from East Australia, but the former lacks the short spines on the varices, but which admittedly could have been worn away in *M. dentifer*. Another similar species is *Haustellum wilsoni* D'Attilio & Old, 1971, from Western Australia, a species which also lacks the deep anal notch of *Haustellum*, but has a finer sculpture and canaliculate sutures.

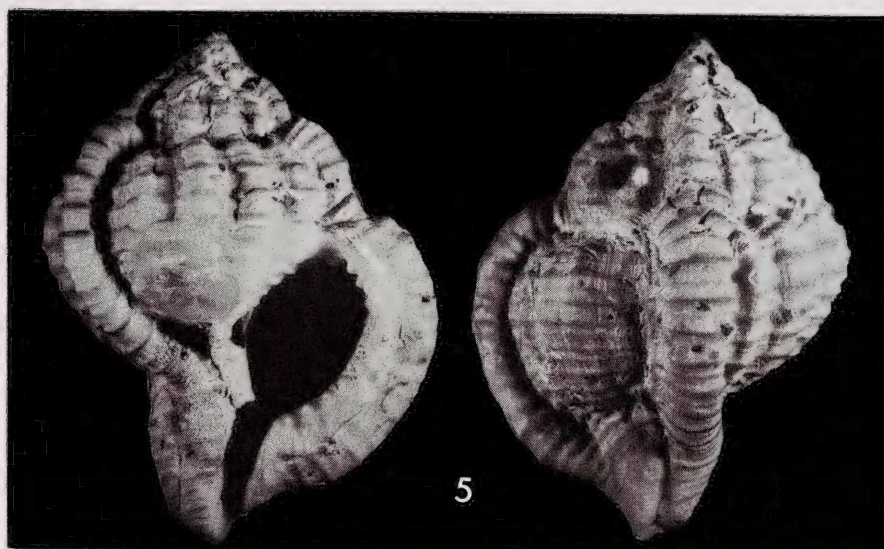


Fig. 5. *Murex (Haustellum) dentifer* Watson. Holotype B.M.N.H., 41.0 + × 31.7 mm.

Family BUCCINIDAE

Genus **Cantharus** Röding, 1798

Subgenus **Pollia** Gray in Sowerby, 1834

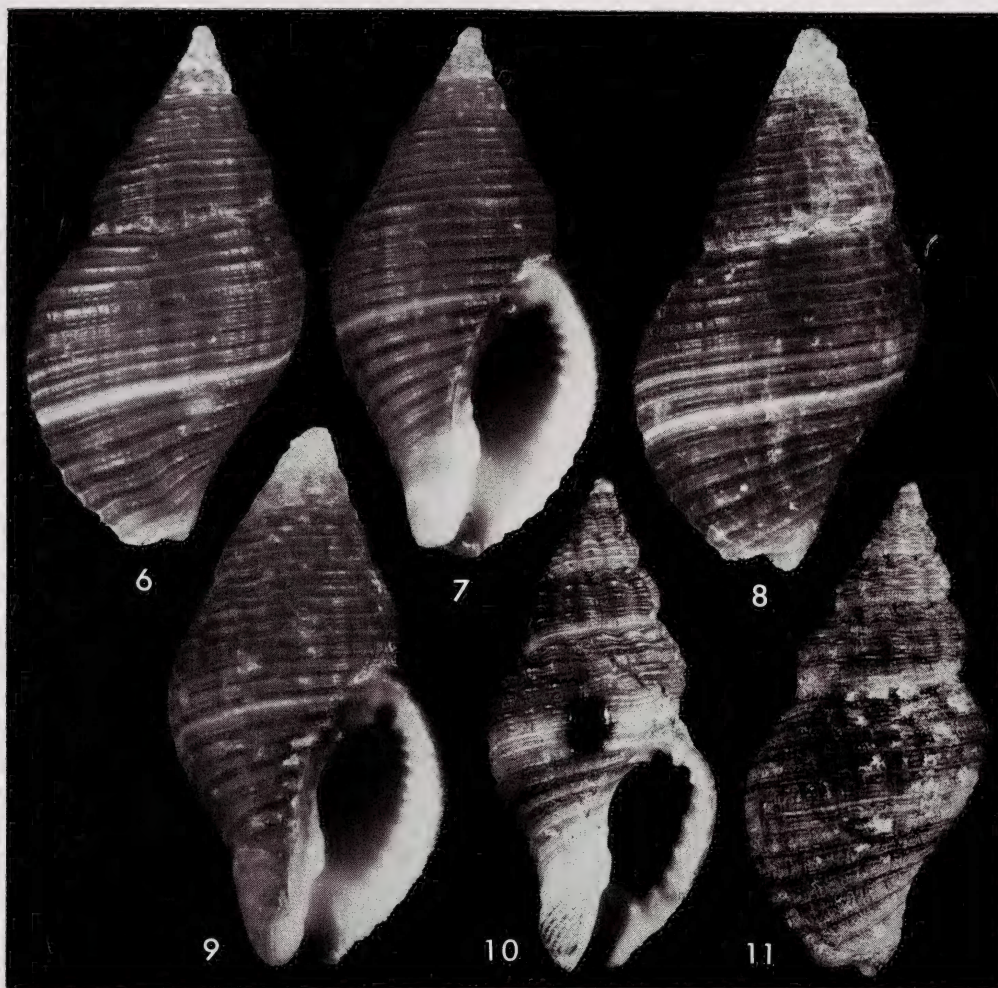
Pollia Gray in Sowerby, 1834, Gen. Rec. Foss. shells, 2: footnote to *Purpura*, pl. 237, fig. 12.
Type species by M *Triton undosum* Lamarck = *Buccinum undosum* Linnaeus, 1758.

Cantharus (Pollia) wrightae sp. n.

(Figs. 6-9, 12, 13)

1971. *Cantharus (Pollia) subrubiginosus* (E. A. Smith), Cernohorsky, Rec. Auckland Inst. Mus., 8: 157, textfigs. 61, 71 (figd. holotype); 1972 Cernohorsky, Marine shells Pacific, 2: 142, pl. 38, fig. 7 (figd. holotype) [non *Tritonidea subrubiginosa* E. A. Smith, 1879].

Shell small, not exceeding 17.0 mm in length, acuminate and solid, protoconch of 2 smooth, white nuclear whorls, teleoconch of $5\frac{1}{4}$ - $5\frac{1}{2}$ regularly convex whorls, sutures weakly impressed. First 3 postnuclear whorls sculptured with axial ribs and overriding spiral cords, axial sculpture vanishing on the last 2 whorls; spiral sculpture consisting of narrow, slightly elevated spiral cords which number from 7-8 in adults and from 4-5 in juveniles on penultimate whorl, and from 21-23 in adults and 18-20 in juveniles on the body whorl. The interspaces are broader than the cords, and contain 1-2 very fine spiral threads which are sectioned into laterally oriented fillets by very fine axial hairlines. Aperture longer than the spire, moderately open, outer lip with 11-12 denticles which continue as lirae into the aperture, parietal wall with a white callus and a denticle, centre of columella only glazed and with 4-5 cords visible under the glaze, anterior of columella calloused and protruding and with 2 moderately large denticles, a third denticle being set slightly posteriorly. Siphonal canal short, siphonal notch prominent. Uniformly dark reddish-brown in colour, ornamented with only a single white band which occupies the space between 2 cords, aperture bluish-white.



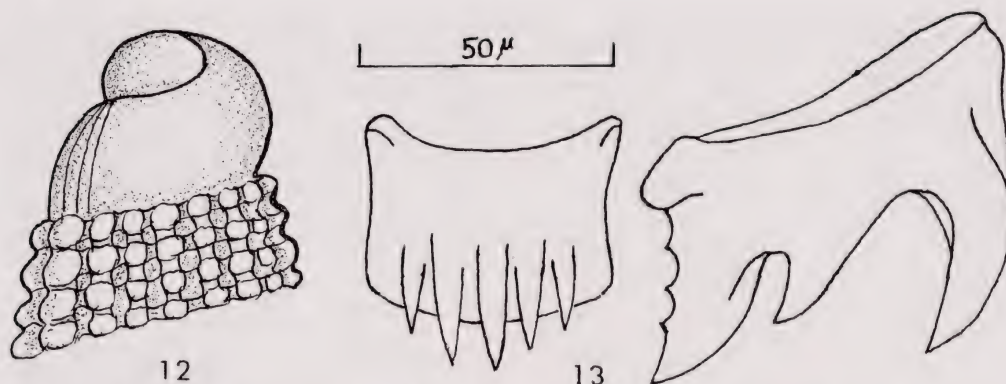
Figs. 6-11. 6-9. *Cantharus (Pollia) wrightae* sp. n. Nananu-i-Ra I., Fiji Is. 6, 7. Holotype AIM, No. TM-1342; length 15.8 mm. 8, 9. Paratype, length 16.2 mm. 10, 11. *C. (P.) subrubiginosus* (E. A. Smith). Holotype B.M.N.H. No. 1878. 11.11.18; length 17.3 mm, width 8.4 mm.

Radula typically buccinoid, formula 1-1-1, rachidian teeth concave at base and with 5 slender cusps which decrease in size towards the sides, laterals of the *Pollia* pattern, tri-cuspid, with the inward-facing cutting edge of the first cusp dentate (Fig. 13).

TYPE LOCALITY. Nananu-i-Ra I., off the North coast of Viti Levu, Fiji Islands.

RANGE. On various coral reef islands off the coast of Viti Levu, Fiji Islands. Habitat: On reefs, among coarse weed on the underside of coral rocks, intertidal.

Holotype. In Auckland Institute and Museum, No. TM-1342; length 15.8 mm, width 8.1 mm, height of aperture 9.3 mm (Figs. 6, 7).



Figs 12, 13. *Cantharus (Pollia) wrightae* sp. n. 12. Protoconch. 13. Radula — half of one transverse row.

Paratypes. 5 paratypes in collection E. Wright, Sanibel I., Florida.

C. (P.) wrightae was originally presumed to have been conspecific with *Tritonidea subrubiginosa* E. A. Smith, from Japan, but examination of the type specimens of *T. subrubiginosa* in the British Museum (Nat. Hist.) No. 1878.11.11.18, has shown that the 2 species are not conspecific. *T. subrubiginosa*, although about the same size as *Cantharus (Pollia) wrightae*, is more slender, the sutures are more distinct, whorls considerably more convex with a coarser sculpture which is slightly rougher, the spiral cords are undulate, the axial ribs are prominent to the penultimate whorl which has 6 spiral cords, and the outer lip has only 6-7 denticles. In colouring, both species are quite different (Figs. 10, 11).

C. (P.) wrightae approaches *C. (P.) fumosus* (Dillwyn, 1817) in shape, but the latter species is considerably larger, has crude axial ribs, a different spiral sculpture and colouring, and the aperture is edged with yellow or orange. Both species are sympatric in the Fiji Islands, but *C. (P.) fumosus* is never found in the same habitat as *C. (P.) wrightae* and no intergrades occur.

The species is named for Miss Eugenia Wright, Sanibel Island, Florida, in whose collection the specimens were deposited.

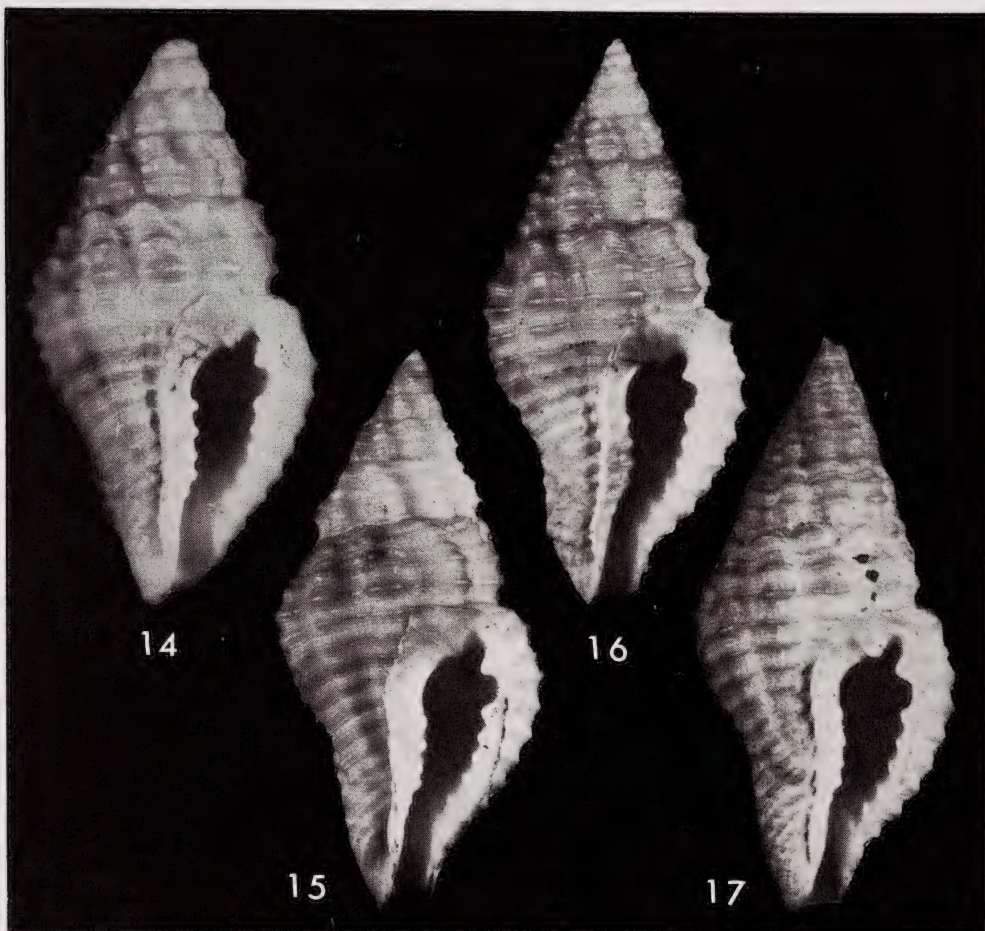
Genus **Engina** Gray, 1839

Engina Gray, 1839, Zool. Capt. Beechey's Voy. Blossom, p. 112. Type species by SD (Gray, 1847) *E. zonata* Gray, 1839 = *Purpura turbinella* Kiener, 1836.

Engina contracta (Reeve, 1846)

(Figs. 14-17)

- 1846. *Ricinula contracta* Reeve, Conch. Iconica, 3: pl. 5, fig. 32 (Panama and St. Elena, W. Columbia = error).
- 1846. *Ricinula acuminata* Reeve, Conch. Icon., 3: pl. 6, fig. 52 (Hab:?).
- 1883. *Engina contracta* Reeve, Tryon, Man. Conch., 5: 193, pl. 62, figs. 41, 42 (with *Ricinula acuminata* Reeve, placed in synonymy); 1909 Dall, Proc. U.S. Nat. Mus., 37: 214 (Gulf of Panama to Guayaquil = error); 1911 Schepman, Siboga-Exped., 49d: 309 (various stations in Indonesia, 9-45 metres); 1971 Keen, Sea shells trop. W. America, ed. 2, pp. 563, 905 (figd. syntypes).
- 1915. *Engina gannita* Hedley, Proc. Linn. Soc. N.S.W., 39 (4): 732, pl. 84, fig. 87 (off Darnley Id., Torres Strait, 30 fathoms); 1972 Ponder, J. Malac. Soc. Aust., 2 (3): 252, pl. 24, fig. 6 (figd. holotype).



Figs. 14-17. 14. *Engina contracta* (Reeve). Syntype B.M.N.H. No. 1968481; length 13.7 mm, width 7.0 mm. 15, 16. *E. acuminata* (Reeve) Syntype B.M.N.H. No. 1968464. 15. Length 14.8 mm, width 7.2 mm 16. Length 13.1 mm, width 6.3 mm. 17. *E. gannita* Hedley, from Darnley I., Torres Str., 30 fathoms (55 m). Paratype B.M.N.H. No. 1915.12.31.113, length 14.3 mm, width 6.5 mm.

Reeve (1846) originally described the species from the west coast of America, and the west American locality was cited by Tryon (1883), who retained *Engina* in the Columbellidae, and by Dall (1909). Keen (1971) tentatively cited *E. contracta* in her list of rejected and indetermined species and indicated that further research on the species is required.

Schepman (1911) examined several dredged specimens from Indonesia which he thought were *E. contracta*, but being unsure of his determination, due to the west American locality, sent them to E. A. Smith of the British Museum. Smith confirmed the Indonesia specimens as *E. contracta*, and considered Reeve's locality indication an error. During a recent visit to the British Museum (Nat. Hist.), the writer was able to compare the type specimens of the taxa in question. It was found that the 4 worn and orange faded syntypes of *Ricinula contracta* Reeve, B.M.N.H. No. 1968481, were

conspecific with the 2 syntypes of *R. acuminata* Reeve, B.M.N.H. No. 1968464, from unknown locality, and also a paratype of *Engina gannita* Hedley, B.M.N.H. No. 1915.12.31.113, from Darnley I., Torres Strait. The holotype of *E. gannita* Hedley, as figured by Ponder (1972) has stronger and more continuous spiral cords which are less prominently interrupted by the intruding axial ribs, than the paratype in the British Museum. A specimen from harbour dredgings in Apia, Samoa, Hedley's (1915) record from the Torres Strait and Schepman's (*op. cit.*) record from Indonesia, confirm the subtidal species as of tropical Indo-Pacific origin.

The species attains a length of about 15.0 mm, is acuminate and sculptured with axial ribs and overriding spiral cords which are nodulose upon the ribs; the interspaces have additional 3-4 fine spiral striae. The aperture is typical of *Engina*, with its broad, lirate columellar pad and convex, denticulate columella. The lirate parietal wall and bulging and often protruding columella are so typical of all Caribbean, West American and Indo-Pacific *Engina* species, that those species lacking this feature should not be admitted in the *Engina* group. Fresh specimens of *E. contracta* are usually reddish-brown in colour.

A similar species *Peristernia thaanumi* Pilsbry & Bryan, 1918, from the Hawaiian Islands, resembles *Engina contracta* according to the description, but the original illustrations are not detailed enough to be certain whether the species is an *Engina*, *Peristernia* or even *Polia*.

Genus **Phos** Montfort, 1810

Subgenus **Strongylocera** Mörch, 1852

Strongylocera Mörch, 1852, Cat. Conchyl. Yoldi, 1: 80. Type species by SD (Cossmann, 1901) *Buccinum cancellatum* Quoy & Gaimard, 1833 (non Gravenhorst, 1807) = *B. textum* Gmelin, 1791.

Shell 15.0 mm-30.0 mm in length, solid, sculptured with prominent axial ribs and weaker spiral threads, later whorls angulate or subangulate at the presutural ramp, sutures adpressed. Nucleus with 3-3½ smooth, white whorls, last nuclear whorl with 4-6 axial riblets. Anterior canal short, deeply emarginate, siphonal fasciole broad, corded, fossa moderately shallow or deep and with a single spiral thread which connects dorsally on to the siphonal notch. Columella descending vertically and bearing a basal fold which is bordered by a groove and an adjacent swelling, posterior part of parietal wall with 2-5 weak ridges in adult individuals. Anterior of outer lip with shallow or deep "stromboid" notch, interior of outer lip strongly lirate (Figs. 18, 19).

Operculum typically buccinoid, corneous, light brown, pointed at both ends, sculptured with concentric growth lines, nucleus undefined. Radula buccinid, rachiglossate, formula 1-1-1, ribbon 2.8 mm in length in a shell 19.0 mm long, with 57 transverse rows of teeth, last 12 rows stained brown. Rachidians with 3 cusps, laterals bicuspid, hind cusp slender, curved and long (Fig. 24).

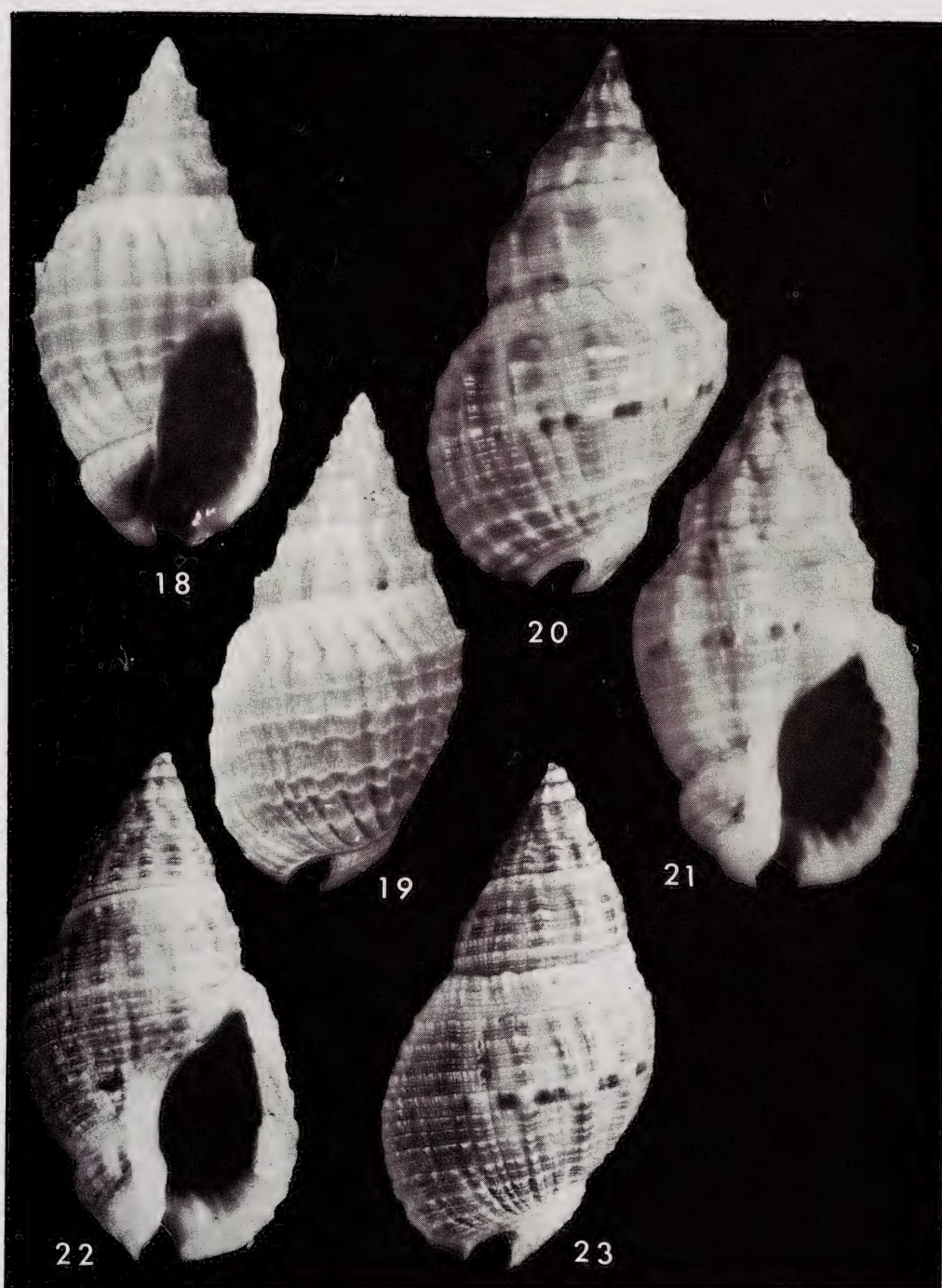
Buccinum textum Gmelin, the type species of *Strongylocera* Mörch, shows considerable generic affinities with the Caribbean species cited in literature as either *Phos unicinctus* (Say, 1827) or *P. guadelupensis* (Petit de la Saussaye, 1852). This affinity has been already pointed out last century by Tryon (1881), Dall (1889) and

Guppy and Dall (1897). On comparing the generic diagnosis of *Strongylocera* Mörch, with that of *Engoniophos* Woodring, 1928, we find them to agree in every diagnostic detail except one: the parietal wall of *Engoniophos* has only a single ridge (as in *Phos. s. str.*) but in *Strongylocera* the parietal wall has from 2-5 ridges or plicae, but only a single ridge in juvenile specimens.

Over 100 specimens of *Phos (Strongylocera) textum* collected by the author in the New Hebrides, where the species is common in clean and weedy coral sand of the intertidal zone, were examined. It was found that while certain characters were variable, others were surprisingly constant. The siphonal fasciole, when heavily calloused, gave rise to a deep fossa, and if weakly calloused resulted in a shallow fossa. The "stromboid" notch on the anterior of the outer lip was either deep or very shallow and the presutural ramp of the body whorl either angulate or weakly sub-angulate. All specimens had only a single basal fold, but the adjacent swelling was either so prominent as to give the impression of a second fold or so weak as to be almost obsolete. Characters which have previously been regarded as constant and worthy of differentiation, i.e. depth of the "stromboid" notch, depth of the fossa, and angulation of the body whorl, were found to be all highly variable in a large series of specimens.

Nassa pallida Powys, 1835, described from Panama, was considered by Keen (1971) to be a *Phos* of Indo-Pacific origin. This species, which generically resembles *P. textum* has not been recognised from the Indo-Pacific region by recent writers except for Faustino's (1928) listing of the species from the "Philippines". Tryon (*op. cit.*) listed *Nassa pallida* Powys as an "American" species from "Panama", and placed *Phos notatus* Sowerby, 1859, from the "Philippines" in synonymy of *Phos pallidus*. He also remarked on their similarity to *Phos textum* (Gmelin) and *P. unicinctus* (Say). Dall (*op. cit.*) echoed Tryon's sentiments when he remarked on the considerable resemblance between *P. unicinctus* and *P. pallidus*.

During an examination of the type specimens of Nassariidae in the British Museum (Nat. Hist.), I came across 3 syntypes of *Nassa pallida* Powys, originally described from Panama, 6 fathoms (11 m), with a note attached "Curacao, *fide* Schepman". Whoever appended the note was correct in assuming that these types were not of Indo-Pacific origin but Caribbean. The syntypes are creamy-white in colour with a dark-spotted narrow central zone on the body whorl, and sculptured with c. 10 axial ribs on the penultimate and the same number on the body whorl; the spiral sculpture consist of 8 spiral threads on the penultimate and 16 threads on the body whorl. The columella has a single fold with an adjacent swelling and the interior of the outer lip has 11 strong lirae. The dimensions of one of the syntypes illustrated in fig. 21 are length 25.7 mm, width 13.7 mm, height of aperture 13.6 mm, and of the other syntype illustrated in fig. 20, length 28.2 mm, width 15.5 mm, height of aperture 15.3 mm. The two syntypes of *Phos notatus* Sowerby, described from the "Philippines" are also in the British Museum (Nat. Hist.) and appear to be conspecific with *P. pallidus*, except that the axial ribs are more slender and the shoulder is less angulate. The illustrated syntype (Figs. 22, 23) measures length 24.8 mm, width 13.3 mm, height of aperture 14.2 mm. *Phos pallidus* (Powys) is therefore not of Indo-Pacific origin but is conspecific with the Caribbean *Phos guadelupensis* (Petit de la Saussaye, 1852), originally described as a *Nassa*, and *P. unicinctus* of authors (? not of Say, 1827).



Figs. 18-23. 18, 19. *Phos* (*Strongylocera*) *textum* (Gmelin). Malapoa Pt., Efate I., New Hebrides; length 20.7 mm, width 10.5 mm. 20, 21. *P.* (?*Strongylocera*) *pallidus* (Powys). Syntypes B.M.N.H. 20. Length 28.2 mm. 21. Length 25.7 mm. 22, 23. *P. notatus* Sowerby. Syntype B.M.N.H., length 24.8 mm.

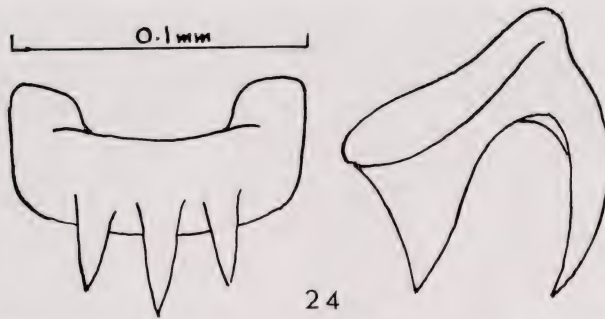


Fig. 24. *Phos (Strongylocera) textum* (Gmelin). Radula — half of one transverse row.

Dall (*op. cit.*) considered Say's locality indication of South Carolina for *Nassa uncinata* as accidental or erroneous, and placed *Nassa guadelupensis* in synonymy of *N. uncinata*. Warmke & Abbott (1961) list and illustrate both species, but point out that they may be conspecific. Woodring (1964) regards *Nassa uncinata* Say as a *nomen dubium* and points out that the species has not been illustrated, the type specimen seems to be lost, the description is not too convincing of the Caribbean *N. guadelupensis* Petit, and the given locality is South Carolina. If Woodring's argument is accepted by authors, then *Phos pallidus* (Powys, 1835) would be an earlier name for *P. guadelupensis* (Petit).

Phos pallidus Powys (= *guadelupensis* Petit) is in our opinion a photine buccinid and not a nassarid belonging to *Pallacera* Woodring, 1964, as suggested by Woodring (*op. cit.*), since the type-specimen of *Nassa myristicata* Hinds, 1844, the type-species of *Pallacera*, differs widely from *Phos pallidus*. The Indo-Pacific *P. textum* and the Caribbean *P. pallidus* display a remarkable similarity of diagnostic features in the angulate or subangulate whorls, protoconch, sculpture, adpressed sutures, vertically descending columella, absence of a nassarid parietal denticle, emarginate siphonal canal, and swollen siphonal fasciole with a spiral thread in the fossa. The radula of *P. pallidus* is unknown to me, but *P. textum* has a typically buccinid photine radula with tri-cuspid rachidians (Fig. 24). *Nassarius myristicatus* on the other hand, has a nassarid radula, 7 plications on the columella apart from a strong parietal denticle and lacks the photid-like elongate aperture, subangulate or angulate whorls and the single columellar fold + swelling. The generic placement of the species requires further study to determine whether it belongs to the buccinid *Engoniophos* Woodring, 1928, as suggested by Warmke & Abbott (*op. cit.*), *Pallacera* Woodring, in the Nassariidae (Woodring, 1964; Keen, 1971) or *Strongylocera* Mörch, from which it differs only in the number of plications on the parietal wall and geographical distribution.

Family MITRIDAE

Genus *Cancilla* Swainson, 1840

Subgenus *Ziba* H. & A. Adams, 1853

Ziba H. & A. Adams, 1853, Gen. Rec. Moll., 1: 179. Type species by SD (Wenz, 1943)
Mitra (Ziba) carinata Swainson = *M. carinata* Swainson, 1824.

***Cancilla (Ziba) bantamensis* (Oostingh, 1939)** (Figs. 25, 26)

1939. *Mitra (Strigatella) bantamensis* Oostingh, Ingen. Nederl.-Indie, 6 (4): 47, pl. 11, figs. 199-205 (Tjirantjabeureum, Sth. Bantam, Java, Pliocene of Indonesia).



Figs. 25, 26. *Cancilla (Ziba) bantamensis* (Oostingh). 25. Tjirantjabeureum, Bantam, Pliocene of Java, Indonesia; holotype, length 19.0 mm, width 7.0 mm (after Oostingh, 1939, pl. 11, figs. 199a, b). 26. Off Nancowry, Great Nicobar, Nicobar Is., intertidal; length 16.0 mm, width 6.7 mm (ZMC).

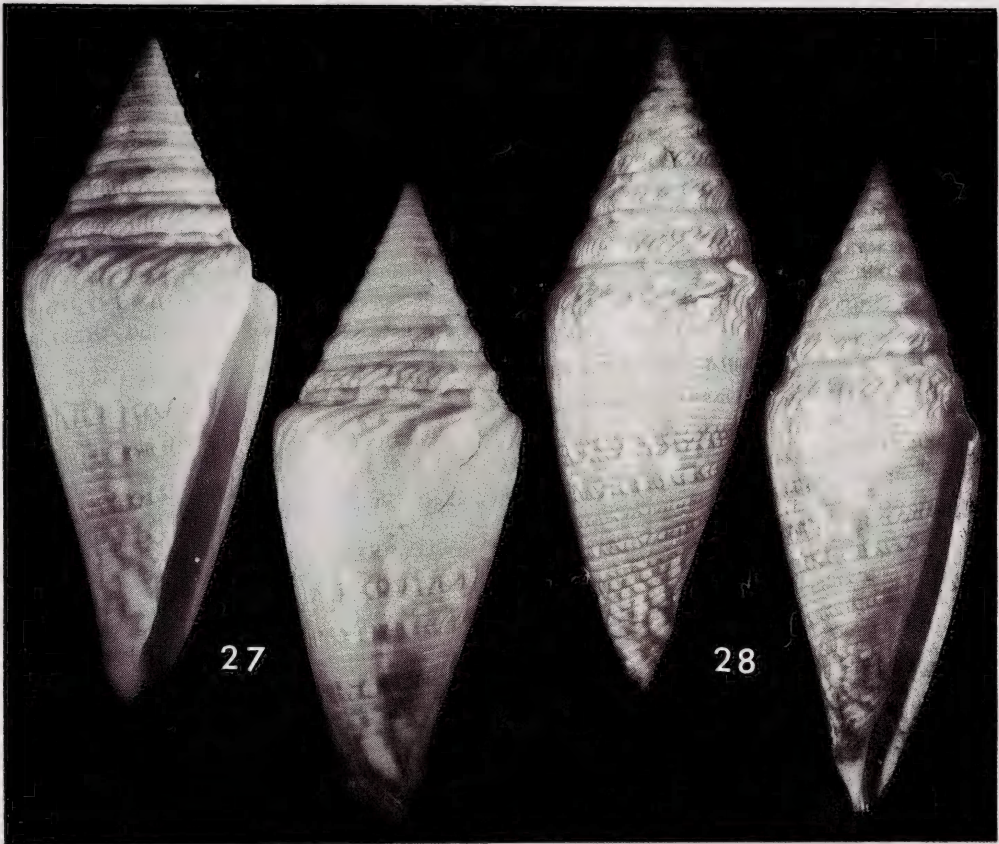
A single specimen of this species, previously known only from Pliocene deposits of Java, has been collected by the "Galathea" expedition at Galathea Bay, off Nancowry, Great Nicobar, Nicobar Islands, intertidally in muddy sand in 1951 (Zool. Mus., Copenhagen).

A detailed description of the fossil specimens of the species is given by Oostingh (1939). The recent, live-taken example is light brown in colour, in parts even fawn, and the aperture and columella are off-white. The spire whorls have a sloping presutural ramp till they reach the prominently angulate single spiral cord and then drop vertically to the suture. The shoulder of the body whorl has an angulate spiral cord and 2 very shallow and almost obsolete spiral grooves with axial lirae; the centre of the body whorl has 5-6 finely incised and pitted spiral grooves which are followed by about a dozen spiral cords which are axially striate in the interspaces. The aperture is longer than the spire, slightly angulate near the start and weakly constricted basally; the columella is weakly calloused and has 5 oblique folds which decrease in size towards the base, siphonal notch distinct. The dimensions of the specimen are length 16.0 mm, width 6.7 mm, height of aperture 10.0 mm.

Family CONIDAE

Genus *Conus* Linnaeus, 1758

Conus Linnaeus, 1758, Syst. Nat., ed. 10, p. 712. Type species by SD (Children, 1823) *C. marmoreus* Linnaeus, 1758.



Figs. 27, 28. *Conus excelsus* Sowerby. 27. Holotype probably from New Caledonia, B.M.N.H., length 88.4 mm, width 34.0 mm. 28. Holotype of *C. pulcherrimus* Brazier, and *Asprella tannaensis* Cotton, from Tanna I., New Hebrides; South Aust. Mus., Adelaide, No. D-6172, length 80.0 mm, width 27.2 mm.

***Conus excelsus* Sowerby, 1908**

(Figs. 27, 28)

- 1894. *Conus pulcherrimus* Brazier, Proc. Linn. Soc. N.S.W., ser. 2, 9: 187 (Tanna, New Hebrides) [non Heilprin, 1879].
- 1908. *Conus excelsus* Sowerby, Ann. Mag. Nat. Hist., ser. 8, 1: 465, textfig. (New Caledonia?).
- 1945. *Asprella tannaensis* Cotton, Rec. Sth. Aust. Mus., 8 (2): 270, pl. 4, fig. 3 (Tanna, New Hebrides) [as *A. tennaensis* on plate expl.].

When Tomlin (1937) cited literature references for *C. pulcherrimus* Brazier, he not only gave the erroneous page number 94, but also suggested that the species has been made the type species of *Kenyonia* Brazier, 1896. Tomlin's assumption was incorrect since *Kenyonia pulcherrima* Brazier, 1896, is not the same as *Conus pulcherrimus* Brazier, 1894 (Brazier 1894, 1896) but is a 28.0 mm long turrid similar to *Conopleura* Hinds, 1844.

Cotton (1945) re-described the species as *Asprella tannaensis*, basing his description on the unique holotype of *C. pulcherrimus* Brazier, in the Kenyon collection of

the South Australian Museum, Adelaide, No. D-6172, length 80.0 mm, width 27.2 mm, height of aperture 52.1 mm. Cotton (*op. cit.*), also illustrated the operculum together with the holotype of *Asprella tannaensis*. The holotype, however, is a worn and faded specimen with 3-4 mm of the outer lip broken off and minute worm perforations on the ventral side of the shell. It is obvious that the shell was collected in beach-worn condition, devoid of the living animal, and the operculum which accompanies the holotype, evidently belongs to some other species.

Although *C. pulcherrimus* Brazier, 1894, is a primary homonym of *C. pulcherrimus* Heilprin, 1879, Cotton's *Asprella tannaensis* cannot be retained because of a prior description of *C. excelsus* Sowerby, 1908. The holotype of *C. excelsus*, also faded and worn, is in the British Museum (Nat. Hist.); the dimensions are length 88.4 mm, width 34.0 mm. The type of *C. excelsus* is somewhat broader than the type of *C. pulcherrimus*, but both are nevertheless conspecific.

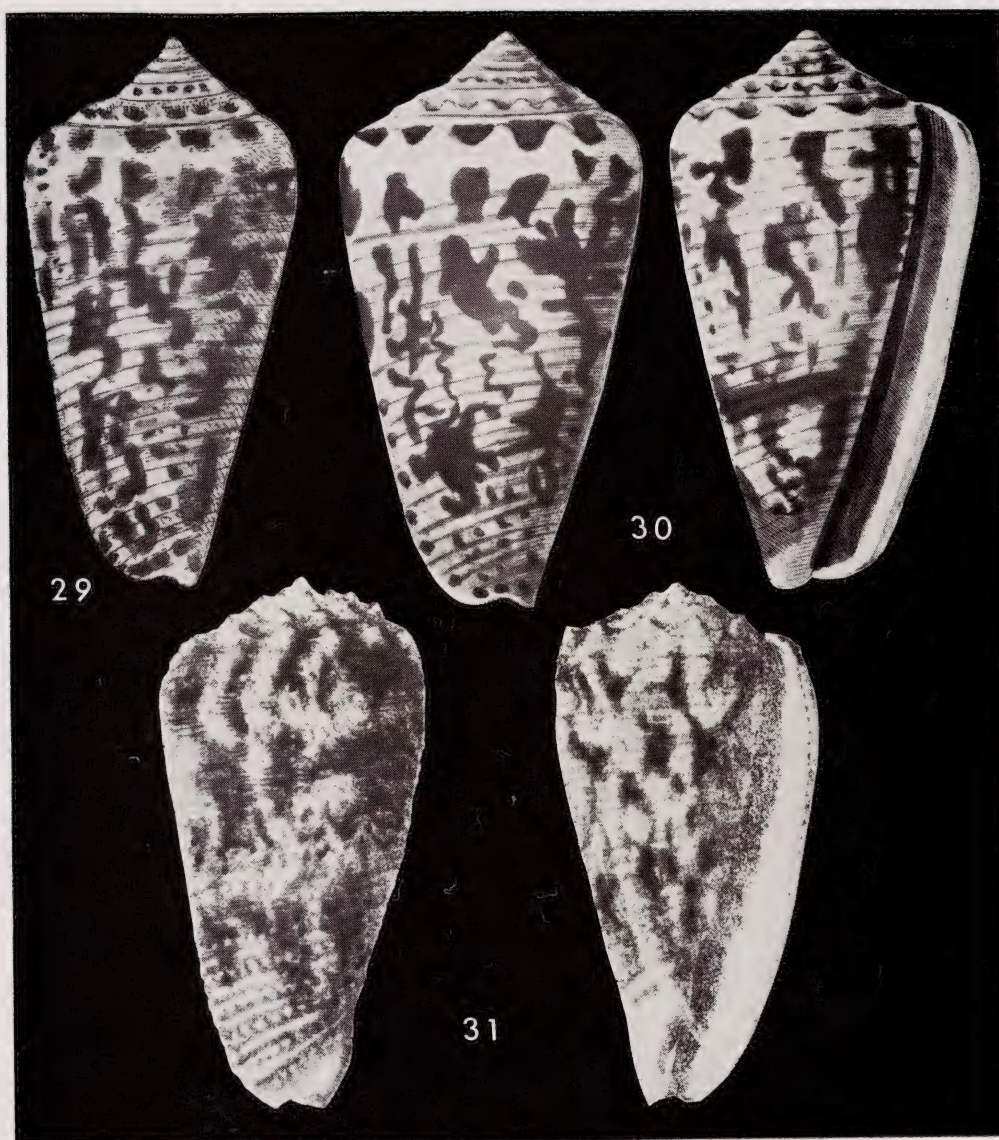
The recently described *Turriconus nakayasui* Shikama & Habe, 1968, from Kashiwajima, Japan, appears to be closely similar, indeed if not conspecific with *C. excelsus* Sowerby. *T. nakayasui* having been described from apparently fresh specimens, has a brownish base colour and 3 white zones on the body whorl of an almost identical pattern as in *C. excelsus* and *C. tannaensis*, where the base colour has faded to yellow. These two species also show the features of a concave presutural ramp, the single peripheral cord with an adjacent smaller cord on the last 2-3 whorls, high spire and narrow aperture, and 15 whorls. The only difference between the type specimen of *C. excelsus* and *C. tannaensis* and *C. nakayasui*, and a feature which is highly variable in *Conus* species, is the number of spiral grooves on the body whorl: 22 in *C. nakayasui* according to the authors, *c.* 35 in *C. tannaensis* and *c.* 40 in *C. excelsus*.

Conus excelsus Sowerby has been collected in New Caledonia and the New Hebrides, and recently has been reported from off Burma, Bengal (Hawaiian Shell News, 1972, 20 (4): 7). The Burmese shell closely resembles the holotype of *C. excelsus*.

***Conus moluccensis* [Küster, 1838]**

(Figs. 29-34)

- 1795. "*Conus moluccensis*" Chemnitz, Syst. Conch. Cab., 11: 63, pl. 183, figs. 1780-81 (Moluccas I.) [*non binom.*].
- 1817. *Conus moluccensis* "Chemnitz", Dillwyn, Desc. Cat. Rec. shells, 1: 421 (refers to Chemnitz, *op. cit.*, figs. 1780-81) [validity of name being considered by the I.C.Z.N.].
- 1838. *Conus moluccensis* Küster, Syst. Conch. Cab., ed. 2, 4 (2): 121, 181, pl. 23, figs. 4, 5 (Moluccas Ids.).
- 1843. *Conus stainforthii* Reeve, Conch. Icon., 1: pl. 1, figs. 1a, b (Hab:?): 1849 Reeve, Conch. Icon., Suppl. p. 3 (*C. stainforthii* synonymised with *C. moluccensis*).
- 1857. *Conus moluccensis* Chemn., Sowerby, Thes. Conchyl., 3: 3, pl. 3 (189), fig. 46.
- 1873. *Conus moluccensis* Hwass, Weinkauff, Syst. Conch. Cab., ed. 2, 4 (2): 394 (*C. proximus* Sowerby questionably placed in synonymy).
- 1969. *Conus* sp. Anonymous, Hawaiian Shell News, 17 (2): 6, fig. on left (off Taganak I., Sth. Palawan, Philippines, 40-45 fathoms) [pustulose form].
- 1970. *Conus moluccensis* (Küster), Schelling, Hawaiian Shell News, 18 (8): 6, textfig. (Okinawa, 150 feet — spirally grooved all over).
- 1973. "*Conus merleti*" Anonymous, Hawaiian Shell News, 21 (7): 3, textfig. (New Caledonia, 150 feet) [*nomen nudum?*].



Figs. 29, 31. *Conus moluccensis* [Küster]. 29. Illustration from Chemnitz, 1795, pl. 183, fig. 1780. 30. Illustration from Küster, 1838, pl. 23, figs. 4, 5. 31. Type figure of *C. stainforthii* Reeve (after Reeve, 1843, pl. 1, figs. 1a, b).

Considerable confusion surrounds the identity of the species which has been usually confused with *C. proximus* Sowerby, in literature. The species was first described by Chemnitz (1795) from the Molucca Islands, Indonesia. His original description is as follows:

"The cone has a thick, strong shell, a white base colour, and is encircled by dark reddish, small and large blotches. The moderately deep spiral grooves carry numerous deep punctae. The many spiral grooves give rise to granulose and nodulose spiral threads on the surface. Between the knots (= coronations) reddish flecks are discern-

ible. The projecting spire is encircled by concentric striae; the interior walls are white. The cone shell has been named *moluccensis* because it has been found in the Molucca Islands." [Free translation].

Chemnitz did not cite any measurements but the figure indicates a length of 43.0 mm. The two views illustrated by Chemnitz do not show the coronations very clearly and no pitting of the grooves is discernible apart from an indication of some granulose spiral cords near the base. The type specimen could not be found in the University Zoological Museum. Chemnitz's non-binominal taxon is not available for taxonomic purposes, and the next probably valid introduction of the name *C. moluccensis* into literature is by Dillwyn (1817). Dillwyn cited the name in his discussion of *C. augur* and appended figure citations to Chemnitz (*op. cit.*). Because of the ambiguity of the style of erection of *C. moluccensis* by Dillwyn, a request for a ruling on the authorship of *C. moluccensis* is pending with the International Commission on Zoological Nomenclature (Cernohorsky, 1974).

Küster (1838) in his revision of the Conidae, once again introduced the taxon into literature, referred to the illustrations and prior description in Chemnitz (*op. cit.*), and appended the following description:

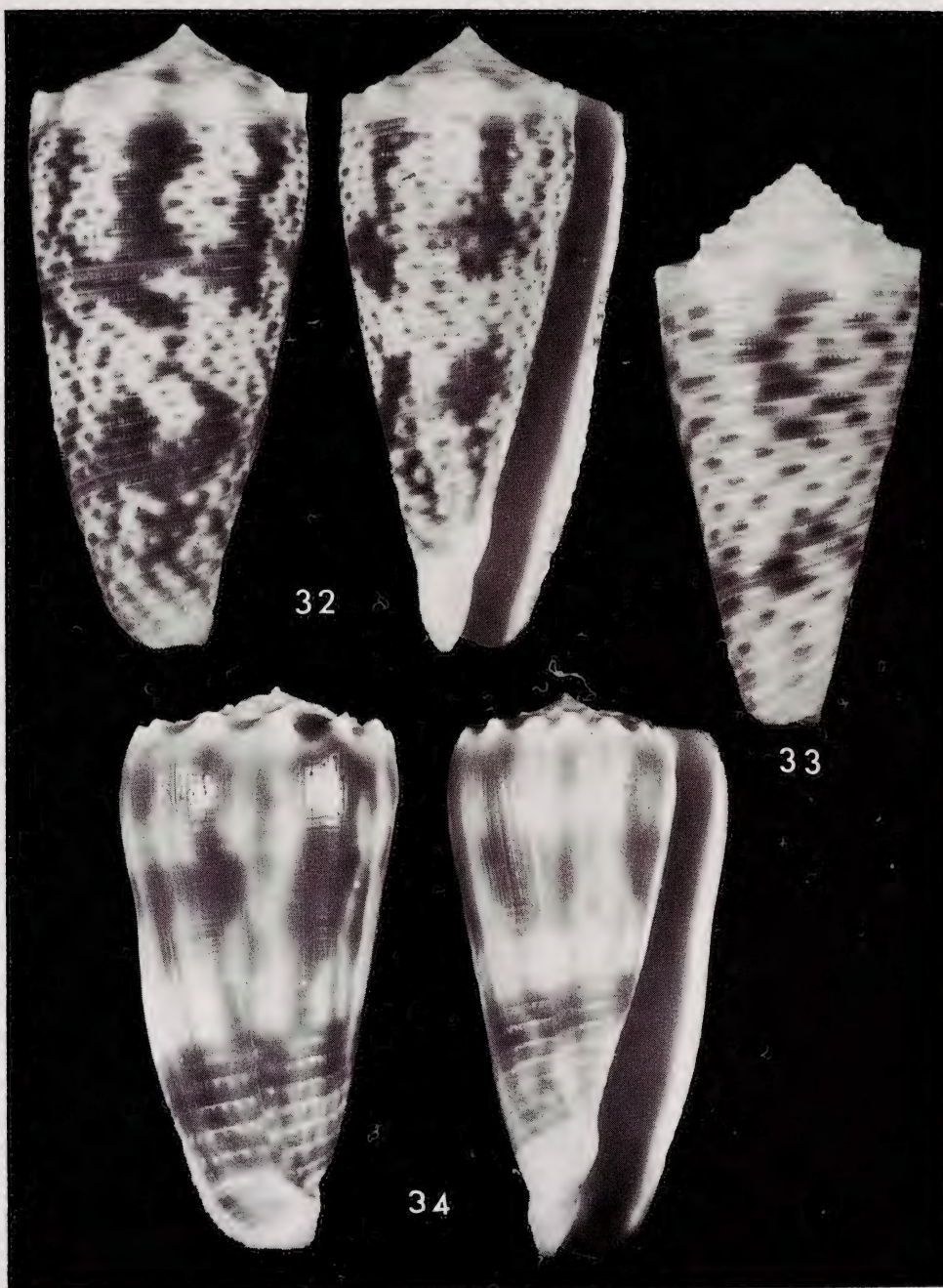
"Shell moderately small, thick and heavy, coniform, surface coronate, sculptured with deepened spiral striae which carry numerous, and to the naked eye hardly discernible punctae. At the base the spiral striae become real grooves. The body whorl is broadly coniform and ends in a pointed spire. The 7 coronate whorls are hardly offset and encircled by concentric striae. Aperture slightly widened, base rounded, siphonal canal notched and oblique. The base colour is white and the shell is encircled by many dark reddish, small or large spots, spire whitish with reddish spots between coronations, aperture white. Length 19 lines [= 41.4 mm], width 10 lines [21.8 mm]. According to Chemnitz the Molucca Islands." [Free translation].

On page 181, the following additional references were cited: Kiener, [1845], p. 49, pl. 75, fig. 2; Sowerby [1857], *Thes. Conchyl.*, pl. 3, fig. 46; *C. stainforthii* Reeve [1843] *Conch. Icon.*, pl. 1, fig. 1.

Küster slightly expanded Chemnitz's original description and although he copied Chemnitz's figures, he improved on them by depicting the spire coronations more realistically (Fig. 30).

Reeve (1843) described *C. stainforthii* from unknown locality, and depicted a granulose form of *C. moluccensis*, which apart from the usual reddish colouring also had some purplish markings. In 1849, Reeve (1849) placed his *C. stainforthii* in the synonymy of *C. moluccensis*. Only the empty box without the type specimen of *C. stainforthii* was found in the British Museum (Nat. Hist.).

Subsequent authors usually confounded the species with *C. proximus* Sowerby, 1859, a very similar yet quite distinct species (for morphological differences see under *C. proximus*). Specimens of *C. moluccensis* are rare and the actual range of variability can only be estimated from the few known specimens. In juvenile individuals the spire is conical and almost flat-sided but becomes lower and concave with maturity. In juveniles the sculpture consists of very strong spiral cords which become smaller, granulose and less elevated in adults. In the smooth form from Okinawa and occasionally New Caledonia, usually labelled "*Conus merleti*", a description we have been unable to trace, the spiral cords are usually replaced by punctate spiral grooves on the upper



Figs. 32-34. *Conus moluccensis* [Küster]. 32. Specimen from unknown locality (pustulose form); length 46.3 mm, width 21.3 mm. 33. Near Matupi I., Rabaul, New Britain, dredged; juvenile specimen, length 37.9 mm, width 18.2 mm. 34. Bolo Pt., Okinawa, Ryuku Is., 32½ fathoms (59 m); length 44.4 mm, width 22.6 mm.

two-thirds of the body whorl, and the typical spiral cords with axially lirate or punctate grooves are visible on the lower third of the body whorl. The sculpture in *Conus* is often variable and smooth and granulose forms are known in *C. planorbis* Born, 1778, *C. catus* Hwass in Bruguière, 1792, *C. floridulus* Adams & Reeve, 1848, *C. sponsalis* Hwass in Bruguière, 1792, and many others. In not fully mature specimens, the shoulder is angulate but becomes more roundly angulate in adult specimens. All adults have an emaciated outer lip which is slightly constricted in its upper third. In some specimens from Okinawa, the spiral sculpture is almost obsolete on the upper half of the body whorl. Both Chemnitz and Küster described the shell as white with reddish ornamentations, and specimens examined showed a colour range varying from bright orange-red, reddish-brown to dark reddish-brown.

Adult specimens measure from 40.0 mm-50.0 mm. The presently known range of the species is from Indonesia to Okinawa, New Britain and New Caledonia, at depth ranging from 20-45 fathoms (37-82 m), and no records are known from the Fiji Islands.

Specimens illustrated as *C. moluccensis* in the Hawaiian Shell News (1972, 20 (9): Suppl. 7) from Tonga, are *C. boeticus* Reeve, and having been printed in reverse show a sinistral aperture.

***Conus proximus* Sowerby, 1859**

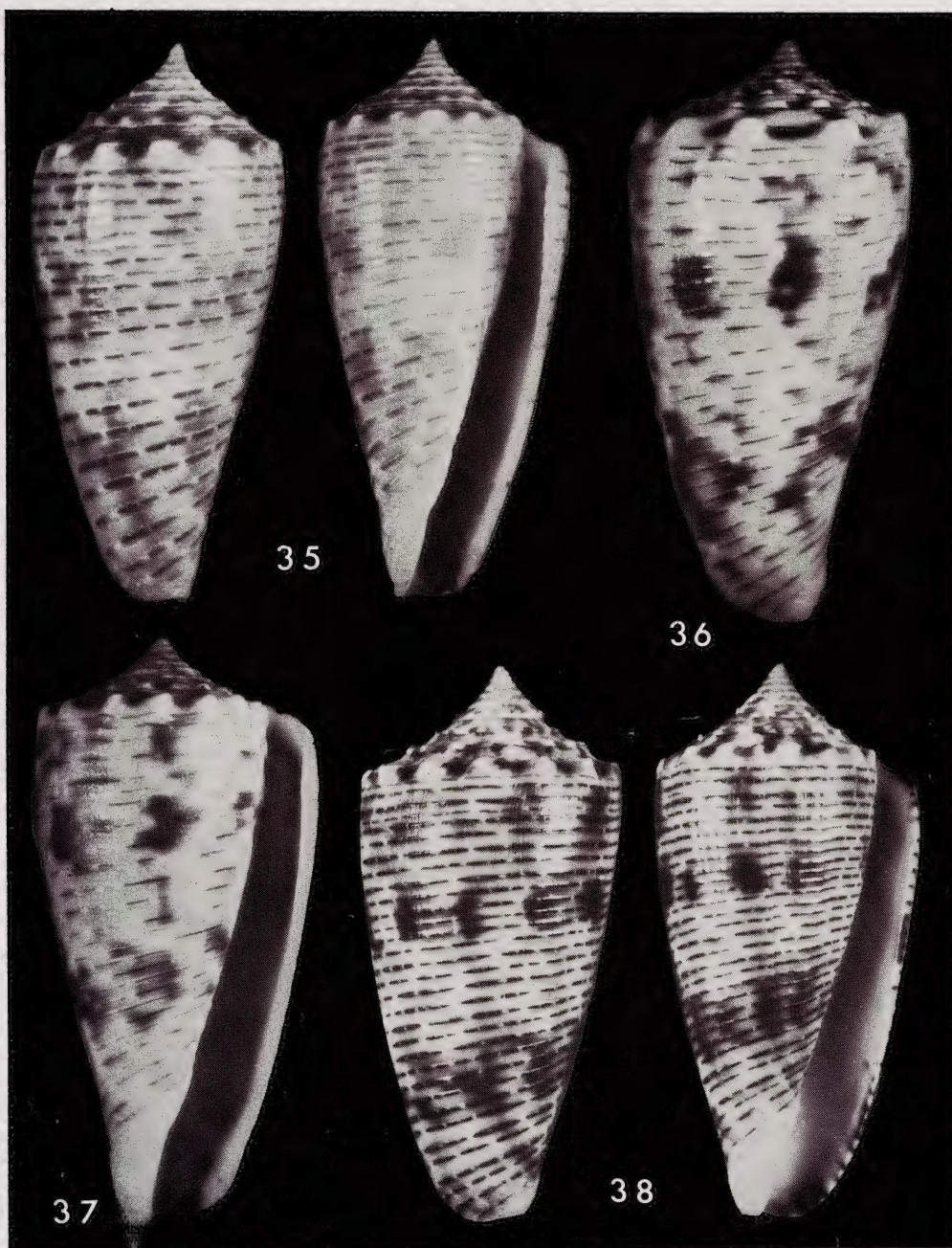
(Figs. 35-38)

- 1854. *Conus pulcher* A. Adams, Proc. Zool. Soc. London, for 1853, pt. 21: 117 (New Caledonia) [non *C. pulcher* Lightfoot, 1786].
- 1857. *Conus pulcher* A. Adams, Sowerby, Thes. Conchyl., 3: 13, pl. 6 (192), fig. 121.
- 1859. *Conus proximus* Sowerby, Proc. Zool. Soc. London, pt. 27: 429, pl. 49, fig. 1 (Hab:?)
- 1964. *Conus moluccensis* Küster, Marsh & Rippingale, Cone shells world, p. 139, pl. 19, fig. 15; 1964 Cernohorsky, Veliger, 7 (2): 81, pl. 17, fig. 53; 1967 Cernohorsky, Marine shells Pacific, 1: 222, pl. 57, fig. 423; 1792 Hinton, Shells New Guinea & Indo-Pacific, p. 88, pl. 43, figs. 21-23; 1973 Leehman, Hawaiian Shell News, 21 (7): 9, top textfig., 2 spec. on right only (non *C. moluccensis* Küster, 1838).

Because of its superficial similarity to *C. moluccensis* Küster, and lack of specimens of the latter for comparison, the two species have usually been considered to be conspecific. *C. pulcher* was first described by A. Adams (1854) from New Caledonia, and later the species was once again described as *C. proximus* by Sowerby (1859) from unknown locality. I have examined the holotype of *C. pulcher* A. Adams, in the British Museum (Nat. Hist.), length 22.1 mm, width 10.0 mm, and compared it with the 3 syntypes of *C. proximus* Sowerby, in the same Institution, and found them to be conspecific. One of the syntypes of *C. proximus* measures length 31.3 mm, width 15.2 mm. *C. pulcher* A. Adams, 1854, being a primary homonym of *C. pulcher* Lightfoot, 1786, is taxonomically not available, and *C. proximus* Sowerby, is the next available name for the species.

The differences in shell morphology between *C. moluccensis* and *C. proximus* are as follows.

Size and shape. Adult specimens of *C. moluccensis* range from 40.0 mm-50.0 mm, those of *C. proximus* from 20.0 mm-45.0 mm in length, with 30.0 mm being the average size. The width:height ratio is about the same in both species, with 46%-54%



Figs. 35-38. *Conus proximus* Sowerby. 35. Holotype of *C. pulcher* A. Adams; B.M.N.H., length 22.1 mm, width 10.0 mm. 36, 37. Syntype of *C. proximus* Sowerby; B.M.N.H., length 31.3 mm, width 15.2 mm. 38. Marau Sound, Guadalcanal, Solomon Is., 20 fathoms (37 m); length 31.0 mm, width 15.0 mm.

of length in *C. moluccensis* and 45%-51% in *C. proximus*. The outer lip in adult *C. moluccensis* is constricted in its upper third but is straight or even slightly convex in *C. proximus*.

Sculpture. This is the most important difference between the two species. In *C. moluccensis* the sculpture consists of either 30-45 moderately strong, granulose spiral cords and occasional finer intermediate threads and prominent axially lirate intervening grooves; in the smooth form the cords are replaced by finely pitted spiral grooves and the cords and lirate grooves are confined to the lower third of the body whorl. In *C. proximus* the pitted or lirate grooves are absent, and the sculpture consists of 25-40 fine, elevated spiral threads and smooth interspaces. In some individuals, however, there are very fine close-set longitudinal growth-lines which appear as weak striae in the last 4-5 grooves at the base. The basal columellar fold is more prominent and calloused in *C. moluccensis* than in *C. proximus*. The coronations are stronger and more erect in *C. moluccensis* but flatter in *C. proximus*.

Colour. *C. moluccensis* has a white base colour and predominantly reddish axial flames and streaks arranged in rather ill-defined 2-3 transverse bands on the body whorl, and the aperture is white. In *C. proximus* the base colour is either cream or light fawn in fresh specimens and the ornamentation is dark brown to blackish-brown with no trace of red at all, and consists of interrupted lines upon the spiral threads which are usually interspersed with small white spots, and small blotches which are arranged in 2, rarely 3, transverse rows. The aperture is not white, but pale blue or light violet. Both species have from 3-6 finer spiral threads and arcuate axial striae on the spire whorls.

C. proximus occurs more frequently in Melanesia, especially Tonga, Fiji, New Caledonia, New Hebrides, Solomon Islands and New Guinea. It is found to a depth of 20 fathoms (37 m), but several specimens have been collected by the author in only 6 feet (2 m) in muddy sand, in the Fiji Islands.

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